

WHAT IS CLAIMED IS:

1 1. A method for semi-continuous culture of plant cells in a nutrient
2 medium, the method comprising monitoring pH of the medium to monitor expression of an
3 expression product made by the cells, wherein the expression product is encoded by a
4 polynucleotide under the control of an inducible promoter.

1 2. The method of claim 1, wherein the plant cells comprise a
2 heterologous expression cassette comprising a polynucleotide encoding the expression
3 product operably linked to an inducible promoter.

1 3. The method of claim 2, wherein the promoter is an α -amylase
2 promoter.

1 4. The method of claim 3, wherein the α -amylase promoter is RAmy3D.

1 5. The method of claim 2, wherein the polynucleotide encoding the
2 expression product is a human α_1 -antitrypsin polynucleotide.

1 6. The method of claim 5, wherein the human α_1 -antitrypsin gene is
2 optimized for expression in plant cells.

1 7. The method of claim 1, further comprising the step of exchanging the
2 medium when the pH is above 6.5.

1 8. The method of claim 7, wherein the step of exchanging the medium is
2 carried out when the pH is above 7.0.

1 9. The method of claim 7, wherein the step of exchanging the medium is
2 carried out by replacing an induction medium with a growth medium.

1 10. The method of claim 1, wherein the plant cell is a rice cell.

1 11. The method of claim 1, further comprising measuring oxygen uptake
2 rate of the plant cells.

1 12. The method of claim 11, further comprising exchanging a growth
2 medium with an induction medium when the oxygen uptake rate is above 2.0 mmol O₂/Lhr.

1 13. The method of claim 12, wherein the step of exchanging the growth
2 medium with the induction medium when the oxygen uptake rate is above 5.0 mmol O₂/Lhr.

1 14. A method for production of a recombinant expression product using
2 semi-continuous culture of transgenic plant cells comprising a heterologous expression
3 cassette comprising a polynucleotide encoding the expression product operably linked to an
4 inducible promoter, the method comprising the step of exchanging an induction medium with
5 a growth medium when the pH of the medium is above 6.5.

1 15. The method of claim 14, wherein the transgenic plant cells are rice
2 cells.

1 16. The method of claim 15, wherein the polynucleotide encoding the
2 expression product is a human α_1 -antitrypsin polynucleotide.

1 17. The method of claim 14, further comprising measuring oxygen uptake
2 rate of the plant cells and replacing the growth medium with the induction medium when the
3 oxygen uptake rate is above 2.0 mmol O₂/Lhr